Workshop:
Maximizing the Value of Environmental Microplastics Data

September 27-28, 2021

An initiative of the University of Waterloo's Water Institute, the Federated Research Data Repository (FRDR) and the Gordon Foundation. Learn more.

Context

Microplastic pollution is a global environmental hazard with far-reaching consequences for food webs, biodiversity, ecosystem services and human well-being. As concern over microplastics grows, research has increased exponentially in Canada (see figure 1). Yet, the data underlying this research are not easily discoverable. Disciplinary repositories that describe data in a standardized manner, such as the global water quality database GEMStat or the Canadian water quality DataStream repository, are not yet designed to support the diversity of data inherent in microplastics research, limiting their ability to accommodate this field. General-purpose repositories such as the Federated Research Data Repository (FRDR), Polar Data Catalogue, or institutional Dataverse repositories can accept any type of data so are well-suited to multidisciplinary fields, but they don't require data

to be documented in a consistent format or template. When data are not shared, and data and metadata that are available are not interoperable, it is more difficult to translate research results into public policy, programs and strategies.

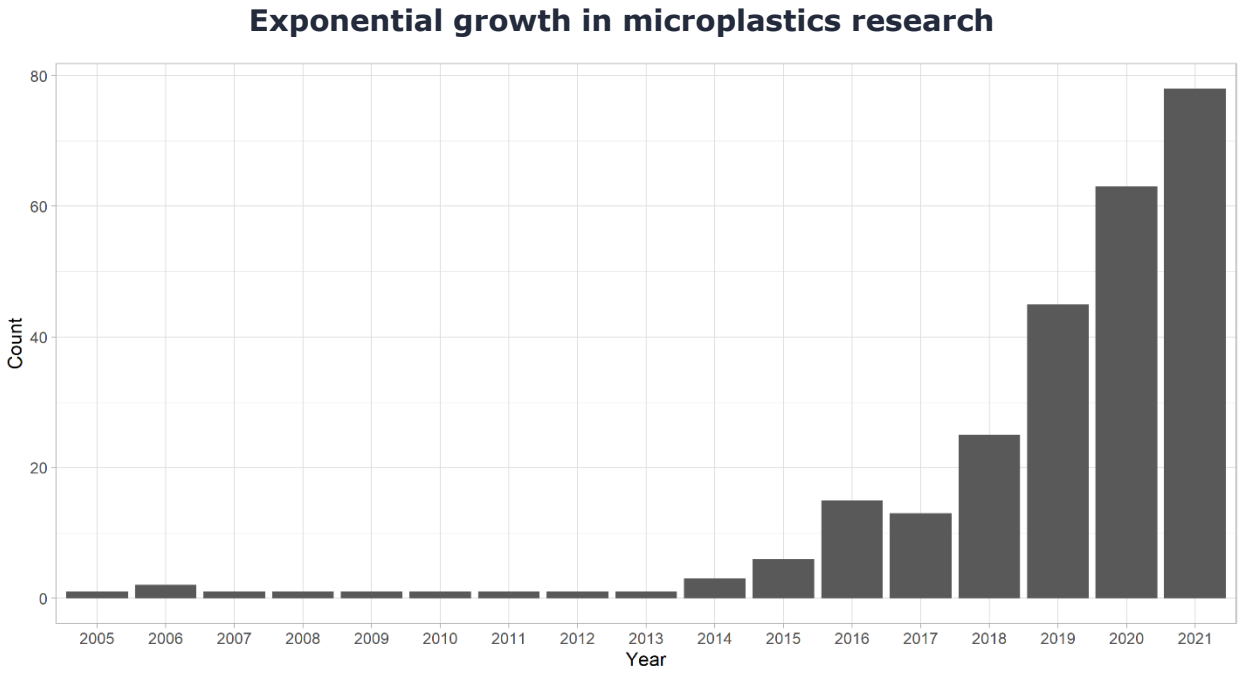

Figure 1: Number of publications with a Canadian institution affiliated author that are related to microplastics (2005-2021). Data was downloaded from Scopus via University of Waterloo library on Aug. 2021 using the search term "microplastic*" and limiting to the Subject Area of Environmental Science.

Workshop Scope

Data access issues are complex, so to facilitate progress during this workshop, focus will be on the following:

- Microplastics research within Canada
- Environmental microplastics data, specifically data collected from soil, water, atmosphere and aquatic sediments

Workshop Objectives

1. Bring together the microplastics research community to identify strategies to improve microplastics data management through the FAIR principles (Findable, Accessible, Interoperable, Reusable).
2. Identify barriers that prevent research groups from sharing microplastics data on open data repositories.
3. Discuss strategies that would enable FRDR and DataStream to accept and publish microplastics data.
4. Identify strategies for implementing data management recommendations outlined in the literature. Seek consensus on a standard set of metadata fields that can be used by researchers to facilitate interoperability across datasets.
5. Identify next steps or further actions needed to implement microplastics data management best practices that align with Canada's commitments to open data and the FAIR principles.

Workshop Deliverables

- A report that summarizes workshop discussions and outlines recommended next steps to improve open sharing of microplastics data that follows FAIR principles
- A microplastics metadata template, adapted from an existing metadata schema (e.g., Water Quality eXchange, Darwin Core, etc.) which can be amended by the wider research community, if needed.

Meeting Agenda-in-Brief

Day 1 – September 27, 2:00 pm to 4:00 pm EST		
TIME	**AGENDA ITEM**	**PRESENTER**
1:55	Please join the meeting 5 minutes early to ensure we can begin on time.	
2:00 - 2:15	**Welcome:** Land acknowledgement, workshop goals, agenda overview	**Chair**: Philippe Van Cappellen, University of Waterloo
Part A: Set the stage – A vision for the future of microplastics data management		
2:15 – 2:25	"Microplastics Data: What's the Purpose?" Presenter: **Paul Helm**, Senior Research Scientist, Ontario Ministry of Environment, Conservation and Parks	
2:25 – 2:55	Improving microplastics data availability: A vision from Canadian open data repositories Presenters: • **Lee Wilson**, Portage Service Manager, Federated Research Data Repository • **Mary Kruk**, Water Data Specialist, The Gordon Foundation	
2:55 – 3:00	Break	
Part B: What are the data challenges and opportunities with respect to microplastics data access in Canada		
3:00 – 3:20	Representatives from microplastics research groups in U.S. and Canada to provide an overview of data management practices, including challenges and opportunities. Presenters: • **Dr. Sherri A. (Sam) Mason**, Professor and Sustainability Coordinator, Penn State Erie, The Behrend College	

	• **Win Cowger**, Research Scientist, Moore Institute for Plastic Pollution Research • **Rachel Giles**, PhD Candidate, Rochman Lab, University of Toronto	
3:20 – 3:50	**Breakout group discussions** Applying FAIR principles to microplastics data: Challenges and opportunities	
3:50 – 4:00	Wrap up and sneak peek into Day 2	**Chair**, Philippe Van Cappellen, University of Waterloo

Day 2 – September 28, 2:00 pm to 4:00 pm EST

TIME	AGENDA ITEM	PRESENTER
1:55	Please join the meeting 5 minutes early to ensure we can begin on time.	
2:00 - 2:10	Day 1 review Objectives for Day 2	**Chair:** Philippe Van Cappellen, University of Waterloo
Part C: Implementing Data Management FAIR Principles		
2:10 - 2:30	"Reporting guidelines to Increase the Reproducibility and Comparability of Microplastic Research" Presenter: **Win Cowger**, Research Scientist, Moore Institute for Plastic Pollution Research "Standardizing Metadata for Environmental Microplastics Research" Presenter: **Rodney Smith**, Assistant Professor, University of Waterloo	
2:30 – 2:50	Q&A	
2:50 – 3:20	**Breakout group discussions** Feedback: Does the proposed metadata template meet your needs?	

3:20 – 3:30	Break	
Part D: Next steps		
3:30 - 3:55	**Breakout groups** What are the next steps associated with implementing a template?	
3:55 - 4:00	Wrap up: summary of deliverables and commitments	**Chair**: Philippe Van Cappellen, University of Waterloo

Acknowledgements

This workshop was made possible by a grant from the Compute Ontario Research Data Management Training and Projects program. Further support was provided by the NSERC/ECCC Alliance Grants - Plastics science for a cleaner future program and Global Water Futures.

Workshop Hosts

An initiative of the University of Waterloo's Water Institute, the Federated Research Data Repository (FRDR) and the Gordon Foundation

The **Water Institute** was established by the University of Waterloo in 2009 to be a global leader in interdisciplinary water research and education. The Institute facilitates interdisciplinary collaboration and knowledge exchange in addressing complex water challenges and promotes innovation in interdisciplinary research and education. With over 150 faculty members, including more than 20 Canada and University Research Chairs, representing 23 departments and schools across all 6 faculties, the Water Institute is the largest research centre on campus and the largest water research centre in Canada.

Federated Research Data Repository

The New Digital Research Infrastructure Organization (NDRIO)'s Portage Network and Compute Canada (CC) are collaborating to provide a scalable, federated platform for digital research data management (RDM) and discovery. They are pleased to announce that the Federated Research Data Repository (FRDR) service has now launched in full production. Anyone can now use FRDR to search for and download data across Canadian repositories and faculty members, or their designates, from Canadian post-secondary institutions may use FRDR to publish their data.

The Gordon Foundation

The Gordon Foundation is a 55-year-old charitable organization with a long history of protecting Canada's waters and promoting citizen engagement in policy making and action. For the past seven years, the Foundation's Water Program has focused on improving access to water data across the country and on empowering communities to engage in evidence-based decision-making processes. The Foundation's work in this area led to the development of **DataStream**, an independent, open access platform for sharing water quality data.

DataStream is free to use and brings together data from across sectors, generated by monitoring programs of all sizes, including community-based water monitoring efforts, Indigenous led programs, academic research initiatives and provincial/territorial and federal programs.

DataStream was developed by The Gordon Foundation and is carried out in collaboration with regional monitoring networks in four hub regions--the Mackenzie Basin, Lake Winnipeg Basin, Atlantic Canada, and, the Great Lakes and Saint Lawrence region.